

Appendix D: Example FAR

FILTER ASSESSMENT REPORT FOR INDIVIDUAL FILTERS

FOR PUBLIC WATER SYSTEMS THAT ARE USING SURFACE WATER SOURCES OR GROUND WATER SOURCES UNDER THE INFLUENCE OF SURFACE WATER THAT ARE REQUIRED TO CONDUCT AN INDIVIDUAL FILTER ASSESSMENT

PUBLIC WATER SYSTEM NAME: <u>TCEQ WSC</u>	PLANT NAME OR NUMBER: <u>PDWS Water Treatment Plant</u>
PWS ID No.: <u>1234567</u>	FILTER NUMBER: <u>Filter No. 5</u>

First Event: December 24, 2015 Second Event: January 6, 2016 Third Event: February 12, 2016

DESIGN SPECIFICATIONS						
FILTER TYPE	Gravity		OPERATING MOD	Constant Rate/Variable Level		
	Diameter (ft)	Length (ft)	Width (ft)	Surface Area (ft ²)	Freeboard (ft)	Max Head Loss (ft)
MEDIA BED DIMENSIONS		12.00	24.00	288.00	3.25	13.00
MEDIA TYPE	Multiple Media					
MEDIA SPECS	Material	Depth (inches)	Min. Size (mm)	Max. Size (mm)	UC	Specific Gravity
Layer 1 Material	Anthracite	24.00	0.90	1.20	1.60	Unknown
Layer 2 Material	Sand	12.00	0.45	0.55	1.40	Unknown
Layer 3 Material	Garnet	3.00	0.20	0.35	1.40	Unknown
Layer 4 Material						
TOTAL DEPTH (inches)	39.00					
L/D RATIO	1206.4					
UNDERDRAIN TYPE	Type-S with gravel					
	No. of Grades	Min. Size (in)	Max. Size (in)	Total Depth (in)		
SUPPORT GRAVEL	4	0.25	1.50	12.00		
TROUGHS		SUPPL. BACKWASH		Air Scour (retrofit)		
Number	5					
Separation (inches)	39.00	FILTER-TO-WASTE		No		
	Regulatory Std	Design	Typical	During Backwash	Maximum	App'd Exception
FILTER FLOW RATE (gpm)	1440	1400	1111	1333	1833	None
LOADING RATE (gpm/ft ²)	5.0	4.86	3.86	4.63	6.36	None
BW FLOW RATE (gpm)	3600 - 6278	5000	3800		5000	
BW LOADING RATE (gpm/ft ²)	12.5 - 21.8	17.36	13.19		17.36	
	Source	Controller	Meter	Turbidimeter		LOHG
FILTER INFLUENT		Fix. weir Splitter	Proportional	None		
FILTER EFFLUENT		None	None	Hach 1720D		Water Lvl Indicator
BACKWASH WATER	Filters & Pump	Mot. Valve (Auto.)	Ultrasonic	None		
<p>ADDITIONAL REMARKS: There flow distribution to the filter is controlled with a fixed-weir splitter box and a valve that is completely opened when the filter is on-line and is completely closed when the filter is out of service during backwash and the subsequent idle period.</p>						

OPERATING PROCEDURES						
CALIBRATION	Flow Meter	Backwash Meter	Mech. ROFC	NTU (Primary)	NTU (Secondary)	
Method	Ultrasonic	Ultrasonic		Formazin	Comparison	
Frequency	Annual	Annual		Quarterly	Weekly	
Date of Last	June 13, 2015	June 13, 2015		January 24, 2016	February 14, 2016	
DATA CONSISTENCY	Frequency and Span	Date	NTU Meter Display	SCADA Display	Data Recorder	Grab Sample
Test Data	every 5 min, 0.00 - 5.00	02/19/2016 14:35	0.271	0.269	0.269	0.29
BACKWASH	Turbidity (NTU)	LOH (ft)	Run Time (hr)	Run Volume (gal)	Filtration Rate	
Criteria	1.0 NTU	10.00	48.00	NA	NA	
Monitoring Interval	5 min	8 hrs	Each Shift			
WRITTEN SOPs		<p>ADDITIONAL REMARKS: We are creating a Filter Inspection SOP as part of this Filter Assessment.</p>				
Plant Start-up	Complete					
Filter Start-up	Complete					
Plant Shutdown	Partial					
Filter Shutdown	Partial					
Filter Backwash	Complete					
Filter Inspection	None					

I certify that I am familiar with the information contained in this report and that, to the best of my knowledge, the information is true, complete, and accurate.

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PUBLIC WATER SYSTEM NAME: TCEQ WSC	PLANT NAME: PDWS Water Treatment Plant
PWS ID No.: 1234567	FILTER NUMBER: Filter No. 5

CURRENT CONDITIONS						
DATE	TIME	TURBIDITY (NTU)	LOH (ft)	FLOW RATE (gpm)	RUN TIME (hr)	RUN VOLUME (gal)
February 17, 2002	6:00 AM	0.32	7.00	1,100	18.75	Unknown
PHYSICAL CONDITION		ADDITIONAL REMARKS: Some of the indicator marks on the LOHG ruler are not legible.				
Walls	Good					
Troughs	Minor Damage					
Suppl. Backwash	Fully Operational					
Flow Meter						
ROFC	Fully Operational					
Flow Control Valve	Fully Operational					
Turbidimeter	Fully Operational					
LOHG	Slight Malfunction					

MEDIA SURFACE CONDITIONS					
	Before BW	After BW		Before BW	After BW
MOUNDS			RETRACTION		
Number	3	1	Number	1	0
Length (inches)	6 - 12	12	Length (inches)	18	
Width (inches)	6 - 9	12	Width (inches)	1	
Height (inches)	1 - 2.5	1.0	Depth (inches)	1.5	
DEPRESSIONS			CRACKS		
Number	6	0	Number	6	0
Length (inches)	18 - 36		Length (inches)	6 - 15	
Width (inches)	5 - 6		Width (inches)	0 - 0.5	
Depth (inches)	1.5 - 3.75		Depth (inches)	0 - 0.5	
ACCUMULATED FLOC			MUDBALLS		
Thickness (inches)	0 - 0.25	Minimal	No. per ft ²	>10	0
Distribution	Uniform	Uniform	Size (inches)	0.25 - 0.75	
			Distribution	Localized	
ADDITIONAL REMARKS: The largest depressions are located adjacent to the backwash troughs. With the exception of one slight mound in the southwest corner of the filter, all of the anomalies were eliminated by the backwash cycle.B269					

BACKWASH CONDITIONS		ADDITIONAL REMARKS: In one area of the filter, a severe jet was observed but we classified it as moderate because it did not seem to affect the backwash effectiveness in other parts of the filter.
BW FLOW RATE (gpm)	2800	
RISE RATE (inches/minute)	15.60	
LOADING RATE (gpm/ft²)	9.72	
DURATION (minutes)	12.00	
TOTAL VOLUME (gallons)	39,200	
TROUGHS		
Levelness	Slightly Unlevel	
Flooding	None	
SUPPL. BACKWASH		
Duration (minutes)	5.0	
Effectiveness	Adequate	
JETTING		
No. of Sites	2	
Severity	Moderate	
BW WATER DISTRIBUTION	Even/Uniform	
SPENT BWW TURBIDITY	2.98	
EXPANSION (inches)	12.00	
EXPANSION (percent)	35.29411765	
YIELD (percent)	Unknown	

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PUBLIC WATER SYSTEM NAME: TCEQ WSC PLANT NAME OR NUMBER: PDWS Water Treatment Plant
 PWS ID No.: 1234567 FILTER NUMBER: Filter No. 5

FILTER PROBE	
NUMBER OF SITES	121
MEDIA	
Max. Thickness (inches)	37.00
Min. Thickness (inches)	26.00
Typ. Thickness (inches)	34.00
SUPPORT MATERIAL	
Max. Elevation	70.00
Min. Elevation	77.00
Typ. Elevation	75.00
ADDITIONAL REMARKS: One relatively large gravel mound was detected in the northeast corner of the filter.	

FILTER EXCAVATION						
	REFERENCE	SITE 2	SITE 3	SITE 4	SITE 5	SITE 6
SITE CHARACTERISTIC	Normal	Normal	Normal	Media Mound	Gravel Mound	Crack
LAYER 1 (Top Layer)	18.00	19.00	18.00	21.00	14.00	18.00
INTERFACE 1	2.50	2.00	2.00	1.50	1.25	2.50
LAYER 2	11.00	12.00	11.00	11.00	10.00	12.00
INTERFACE 2	0.75	0.50	0.75	0.50	0.50	
LAYER 3	4.00	4.00	3.75	3.00	0.00	
INTERFACE 3						
LAYER 4						
MUDBALLS	Few	None	None	Few	None	Few
Max. Size (inches)	0.75			0.50		0.50
Min. Size (inches)	0.25			0.13		0.25
Max. Depth (inches)	4.00			5.00		3.00
	SITE 7	SITE 8	SITE 9	SITE 10	SITE 11	SITE 12
SITE CHARACTERISTIC	Retraction	Jetting				
LAYER 1 (Top Layer)	18.00	18.00				
INTERFACE 1	2.00	4.75				
LAYER 2	12.00	8.00				
INTERFACE 2	1.00	2.50				
LAYER 3	3.00	2.00				
INTERFACE 3						
LAYER 4						
MUDBALLS	Several	None				
Max. Size (inches)	0.75					
Min. Size (inches)	0.25					
Max. Depth (inches)	7.00					
MEDIA CONDITION		ADDITIONAL REMARKS: The sand and garnet seemed in very good shape. The anthracite seemed slightly worn and encrusted. The anthracite grains did not seem very uniform in shape or size.				
Sharpness	Good					
Encrustation	Slight					
Uniformity	Marginal					

ADDITIONAL STUDIES		
FILTER PROFILE ATTACHED? Yes <i>Note: A Filter Profile must be attached to this report.</i>	ADDITIONAL REMARKS: Several of the mudballs were placed in a chlorine solution (200 ppm, pH=4.5) for 12 hours and the mudballs dissolved. A representative sample of filter media was dried in an oven, weighed, and then placed in the acidified chlorine solution. After 12 hours, the media was removed, rinsed several times, dried and reweighed. The media lost 12% of its mass. The chlorine solution had a brownish tint so we neutralized the chlorine with thiosulfate and ran iron and manganese tests on the material. The manganese result was 0.55 mg/L and the iron result was 0.2 mg/L.	
PERCENT MUDBALLS		
Media Volume (ml)		1680
Mudball Volume (ml)		14
% Mudballs	0.8%	

CONCLUSIONS	
CONCLUSIONS: We have lost 5-6 inches of our anthracite and the anthracite that remains seems to no longer meet manufacturer's specifications. There is also a large gravel mound in one area of the filter. The presence of the severe backwash jet and the degree that the media layers were intermixed suggests that there is some underdrain damage in that part of the filter. The filter profile that was run on February 19th suggests that the performance of Filter No. 5 is adversely affected by sudden flow rate changes.	CORRECTIVE ACTION PLAN ATTACHED? <div style="text-align: center; border: 1px solid black; padding: 2px;">Yes</div> WOULD YOU LIKE SOME TECHNICAL ASSISTANCE FROM THE TCEQ? <div style="text-align: center; border: 1px solid black; padding: 2px;">No</div>

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PUBLIC WATER SYSTEM NAME: TCEQ WSC

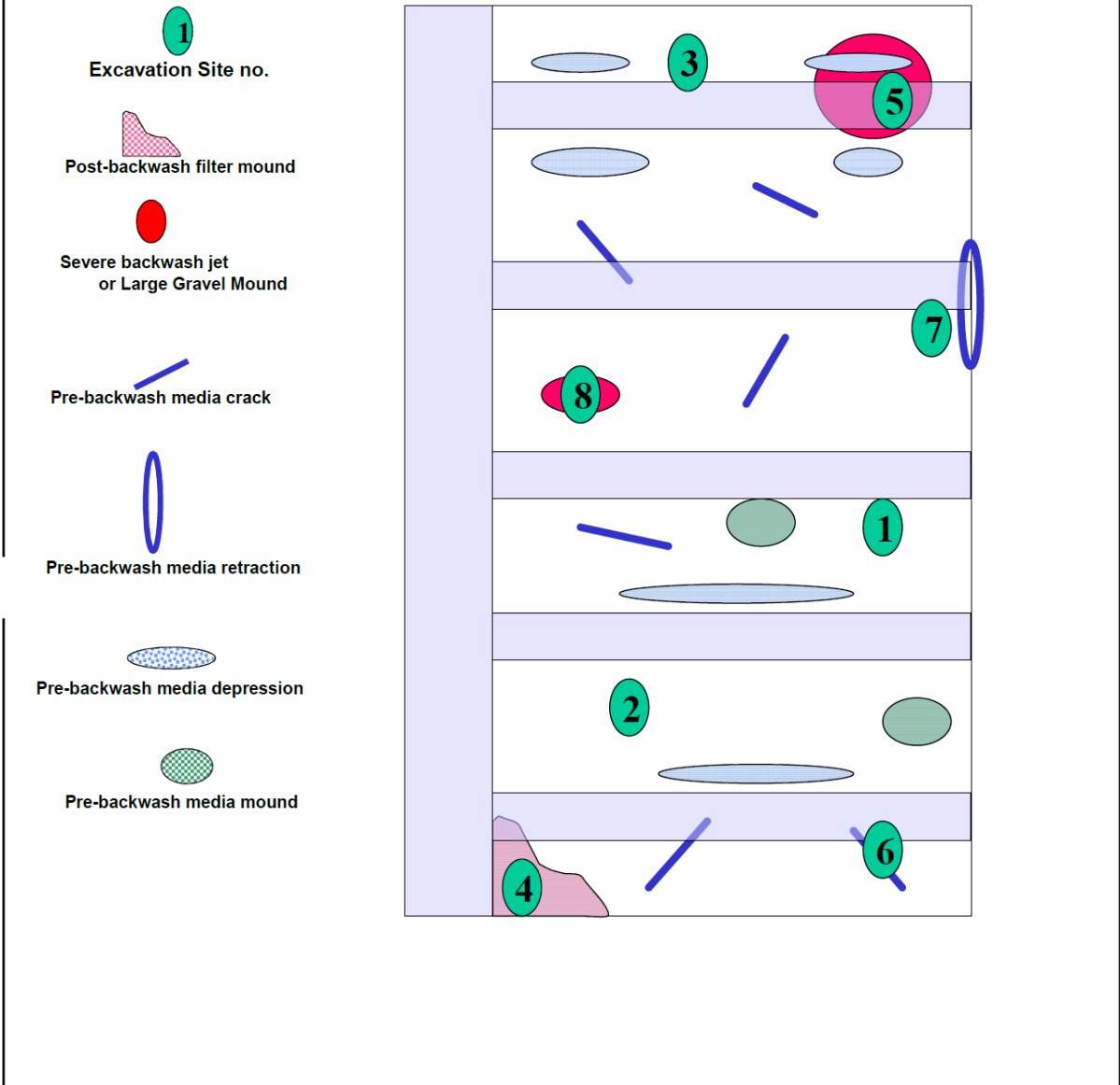
PLANT NAME OR NUMBER: PDWS Water Treatment Plant

PWS ID No.: 1234567

FILTER NUMBER: Filter No. 5

FILTER SCHEMATIC

PREPARE A SIMPLE FILTER SCHEMATIC SHOWING THE LOCATION OF BACKWASH WATER TROUGHS, OBSERVED ANOMOLIES, AND EXCAVATION SITES.



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NARRATIVE DESCRIPTION OF FILTER PROFILE

DESCRIBE THE FILTER PROFILE, INCLUDING THE CAUSE OF ANY TURBIDITY SPIKES GREATER THAN 0.1 NTU AND ANY INTERRUPTION IN THE DATA

See Attached Excel Graph

Submitted by: _____

Date: February 23, 2016

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CORRECTIVE ACTION PLAN (OPTIONAL)

DESCRIBE THE CORRECTIVE ACTIONS THE SYSTEM WILL TAKE, INCLUDING THE PROPOSED COMPLETION DATA FOR EACH CORRECTIVE ACTION

Proposed Completion Date	Proposed Action
May 1, 2016	Order replacement media for Filter No. 5
July 12, 2016	Remove media from Filter No. 5 and inspect support gravel layer and underdrain system for evidence of damage
July 15, 2016	Install new media, backwash, and superchlorinate the filter
July 18, 2016	Submit coliform samples to the lab
July 22, 2016	Return the Filter No. 5 to service

Note: This action plan is subject to delays if the filter underdrain is damaged. In this case, we plan on having our engineering firm evaluate potential corrective actions.

Submitted by: _____

Date: February 23, 2016